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ABSTRACT

The purpose of this booklet is to provide citizens with information about household waste and to indicate how they can contribute to its reduction. Information indicates how each individual can reduce waste by adopting new habits, making informed choices, and becoming involved in community action. Discussed are: (1) specific issues of general and household waste; (2) roles the individual can play in waste reduction; (3) roles the community can play; (4) specific innovative programs; and (5) legislative initiatives at the state and federal levels. Specific guidelines for action are detailed. Organizations and agencies involved in these issues, and selected readings are listed. Lists 39 references.
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Household Waste

issues and opportunities

Concern, Inc.

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About This Booklet

The purpose of this booklet is to provide citizens with information about household waste and to indicate how they can contribute to its reduction. It demonstrates how each individual can reduce waste by adopting new habits, making informed choices, and becoming involved in community action.

This is the latest in CONCERN's community action guide series which includes *Groundwater*, *Pesticides*, *Drinking Water*, *Farmland*, and *Waste: Choices for Communities*. These booklets are available from CONCERN, Inc., 1794 Columbia Road, NW, Washington, DC 20009. Special bulk rates are available to nonprofit organizations.

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The Issue

Households in the United States generate more trash than those of any other nation on earth. Every resident of New York City, for example, discards an average of four to six pounds of garbage per day, while in Rome each person throws away about one and a half pounds. As consumption increases—especially of disposable products—the waste of our profligate society is overflowing landfills and polluting air, land, and water.

Land disposal of household waste is increasingly affecting the environment and human health. Landfills can pollute the groundwater beneath them, contributing substantially to the contamination of drinking water sources. They can also pollute the air around them with methane and poisonous gases. The potential dangers of fire and explosions are always present. Finally, land that could be used for more productive purposes must be set aside for landfills.

Incineration of wastes affects air, land, and water. Emissions of acid gases, heavy metals, dioxins, and particles of ash from incinerators can pollute the air. The ash residue from incinerators not only can contribute to air pollution but also threatens groundwater if not disposed of in a properly designed landfill.

Improper disposal of hazardous household products such as pesticides, paints, toilet bowl cleaners, oven cleaners, motor oil, and bleach can contaminate groundwater and surface waters which may serve as drinking water sources. Disposal of

wastes in the ocean is also a severe problem for aquatic animals and fish.

The responsibility for waste disposal rests with each of us. The most important contribution individuals can make is to avoid generating waste in the first place. Additionally, innovative policies and programs must be supported. Instead of turning to the traditional methods of dealing with waste, communities are developing management systems which meet their particular needs and which depend upon the cooperation of each household.

Such programs are designed to use waste as a resource for the environmental and economic enhancement of the community. They emphasize source reduction and recycling. **Source reduction** means cutting down on waste generation by purchasing durable products and by avoiding products that are overpackaged or potentially hazardous to human health or the environment. **Recycling** reuses valuable resources, reduces energy use, creates jobs, and lowers costs through cutting the amount of waste that must be incinerated or landfilled.

This booklet will attempt to answer the most common questions about household waste management. It will demonstrate how each individual and household has the opportunity to contribute to the goals of reducing or recycling waste, of reducing its toxicity, and of encouraging the manufacture and use of products that are non-polluting, reusable, or recyclable.

Key Questions About Waste

What is household waste?

Household waste is largely composed of paper, food, and yard wastes, although plastics form a rapidly increasing share. It also contains some toxic materials. Household waste constitutes as much as half of municipal solid waste, the remainder coming from small businesses and commercial establishments.

Why is household waste a problem?

As US consumption rises, so does the volume of waste. Between 1960 and 1988 the amount of waste discarded per capita doubled. It will continue to grow as disposable items proliferate and superfluous packaging increases. While some claim that this trend is the result of the high standard of living we enjoy, other industrialized nations—West Germany and Japan, for example—generate only half as much waste per capita.

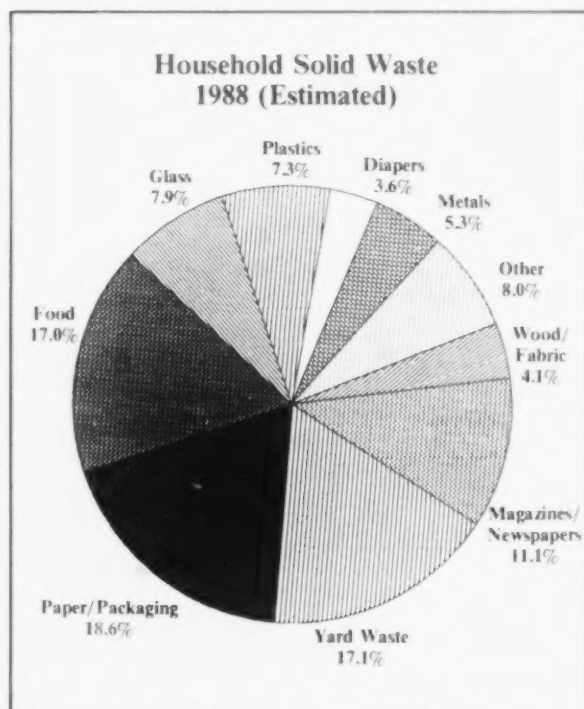
We are running out of places to put our garbage. Landfills are closing because they are filling up and/or are unable to meet recently imposed new state standards. According to the US Environmental Protection Agency (EPA), 45% of the country's landfills will be closed by 1993. Siting of new landfills

and incinerators is increasingly difficult because of citizen opposition.

While most household waste is non-hazardous, there is a small but significant toxic component consisting of discarded solvents, batteries, paints, and pesticides. It is of concern because it can leak through landfills and contaminate vast quantities of surface water and groundwater; it presents a threat to sanitation workers; and, due to the lack of disposal options, these materials are often stored in the home in an unsafe manner. Even those materials in the household waste stream which have not been thought of as toxic may contain toxic elements—household batteries, for example.

"We will make pollution prevention a hallmark of our environmental efforts ... Recycling, reuse, reduction at the source—these will be our watchwords."

William K. Reilly,
EPA Administrator



Source: The Garbage Project, University of Arizona, Tucson

Will the decreasing availability of landfill space affect the costs of disposal?

The costs of disposal have escalated dramatically, especially in urban areas. Tipping fees, or the costs per ton of landfilling or incinerating garbage, have increased as much as six-fold in many areas. In Newark, New Jersey, for example, waste disposal costs rose from under one-half million dollars to 24 million in less than 10 years.

As landfills close, transportation costs escalate, especially for eastern states like New Jersey that send their garbage to other states, sometimes as far as New Mexico. Landfill regulations proposed by EPA in 1988 will raise these costs even further. (Final rules are to be published in December 1989 and become effective 18 months later.) The individual household will eventually bear the burden of increased costs.

What is done with household waste at present?

In the US, 80% or more of the household waste generated goes to landfills, about 10% is incinerated, and about 10% recycled.

Is incineration a solution?

With landfill space shrinking, many communities are considering burning their waste, but there are still unanswered questions about the health effects of emissions from the stacks of municipal waste incinerators and the safe disposal of incinerator ash, much of which fails EPA's toxicity test for hazardous waste.

Incinerators can emit acid gases such as hydrogen chloride and sulfur dioxide, heavy metals such as lead and cadmium, dioxins, and particles of ash—all threats to human health as well as to the environment. Lead, for example, causes brain, nerve, and kidney damage, and is highly toxic to infants and pregnant women.

Air can be polluted further if toxic household products are not removed before wastes are burned in incinerators; for example, the extraction of household batteries decreases the emissions of mercury, cadmium, and other heavy metals.¹

Ash residue, which can represent from 10% to as much as 50% of the original volume of waste, takes up a large amount of dwindling landfill space. It also routinely contains heavy metals and other toxic components. Often dumped on the ground or transported in open trucks, it pollutes the air. Unless it is disposed of in hazardous waste or special landfills, it threatens groundwater.

Incineration can discourage recycling and waste reduction by requiring a guaranteed waste flow. Often waste must be imported from other communities to provide the necessary amount of waste for efficient performance. Finally, incinerators are enormously expensive and have had very poor performance records in many instances.²

Why is ocean disposal a problem?

More than 45,000 tons of plastic waste are dumped in the world's oceans every year creating a serious threat to aquatic animals and fish. They can be trapped in or be strangled by plastic fishing nets, fishing line, plastic bags, or other plastic debris, or can die from ingesting them. Similarly, plastic litter on the land is a threat to wildlife.

How can I cut the amount of my household waste?

Careful shopping can reduce the volume of waste: buying reusable and/or repairable items; buying the least packaged products; and buying products which have long life. Recycling also cuts the volume of waste. If curbside collection is not available, there are often

collection sites which accept newspapers, glass, and aluminum and steel cans. Composting decreases significantly the volume of yard waste.

Consumers can also urge local stores to stock recycled and recyclable products and those with the least packaging. They can influence manufacturers by demanding products which do not damage the environment either through use or disposal.



What can be recycled?

Paper, glass, aluminum, and bi-metal cans have been recycled in some communities for many years. Plastics are now beginning to be included. Food and yard wastes can be composted.

What is household hazardous waste?

This waste includes products that are toxic, corrosive, inflammable, caustic, volatile, or explosive. There are literally thousands of household products that contain toxic ingredients. Among them are drain cleaners, oven cleaners, pesticides, and furniture polish.

Sometimes it is not possible to tell whether or not they are toxic. Ingredients are not required to be listed on some products because they are not considered to cause immediate illness; others are not labeled as toxic because they contain only a small amount of toxic substances. Pesticides are of special concern because of their wide home use and their extreme toxicity. Even very small amounts of discarded pesticides can kill fish and birds.

How is human health affected by exposure to household toxics?

Toxics taken into the body through ingestion, inhalation, or absorption through the skin can result in damage to the nervous system, the liver, the kidneys, or the reproductive system. Immediate effects from poisoning by the organic chemicals in toxic household products include headache, nausea, dizziness, fatigue, stomachaches, and diarrhea.

Less is known about the long-term effects of organic chemicals and cause-effect relationships are extremely difficult to establish. The determination of the chronic effects of exposure to toxic chemicals is further complicated by the degree to which effects are reversible, the long latency period between exposure and the onset of disease, and the difference in sensitivity among individuals.

The chemically-sensitive can be seriously affected by one slight exposure while others can be subtly and

gradually impaired by continuing exposure. In addition, almost nothing is known about the effects of exposure to a number of toxics in combination.

Why shouldn't toxic household products be thrown into the trash?

If toxic materials are thrown into the trash, they can pollute drinking water and/or degrade air quality. During the compaction process in the truck or at the landfill most containers will break, and their liquid contents will eventually leach into groundwater. If the trash goes to an incinerator, toxic gases and toxic ash will be generated.

Acute effects from exposure to toxic substances are usually the result of improper use of household hazardous products but can also occur as a result of unsafe disposal practices. Trash collectors and landfill workers are particularly at risk from fires, explosions, and leakage of toxic materials.

Hazardous Contents of Common Household Products

Household Cleaners	Oxalic acid	Chlorinated aromatic hydrocarbons	Batteries
<i>Air freshener</i>	Petroleum distillates	Esters	Lead
Alkyl phenoxy polyethoxy ethanol	Petroleum solvents	Ketones	Sulfuric acid
Isobutane	Phosphoric acid	Toluene	
Propane	1,1,1-Trichloroethane	<i>Varnish/sealant</i>	
<i>Ammonia based cleaner</i>	<i>Toilet bowl cleaner</i>	Benzene	Pesticides and Yard Maintenance
Ammonia	Chlorinated phenols	Lead	<i>Fertilizer</i>
Ammonium hydroxide	Sodium acid sulfate or oxalate	Methyl and ethyl alcohol	Ammonia
Diethylene glycol	or hydrochloric acid	Methylene chloride	Nitrogen
Ethoxylated alcohol	Trichloro-s-triazinetriene	Mineral spirits	Phosphorus
Phenols	<i>Oven cleaner</i>	Pentachlorophenols	Potassium (concentrated)
Sodium hypochlorite	Sodium or potassium hydroxide	Petroleum	<i>Herbicides</i>
Surfactants			Chlorinated phenoxy
Xylenols			Dipyndyl
<i>Drain opener</i>	Household Maintenance	Automotive Maintenance	Nitrophenols
Hydrochloric acid	<i>Glue</i>	<i>Antifreeze/coolant</i>	Pesticides
Potassium hydroxide	Acetone	Ethylene glycol	Aromatic petroleum hydrocarbons
Sodium hydroxide	Asbestos fiber (asbestos cement)	Methanol	Carbamates
<i>Floor finish</i>	Hexane	Auto wax	Chlorinated hydrocarbons
Ammonia	Methylene chloride	Petroleum distillates	Coumarin
Diethylene glycol	Methyl ethyl ketone	<i>Engine treatment</i>	Naphthalene
Petroleum solvents	Toluene	Methylene chloride	Organophosphorus
<i>Laundry soap, dishwashing detergent</i>	<i>Paint</i>	Mineral spirits	Petroleum distillates
Ethylene glycol	Halogenated aromatic hydrocarbons	Petroleum distillates	Triazine base
Methanol chloride	Methylene chloride	Toluene	Uracil
Perchloroethane	Mineral spirits	1,1,2-Trichloroethylene	Urea
Sodium hypochlorite	Toluene	Xylenes	Xylene
Surfactants	Xylene	<i>Oil and transmission fluid</i>	<i>Pet treatment (flea and tick)</i>
Tetrachloroethylene	<i>Paint thinner and stripper</i>	Lead	Carbaryl
<i>Polish</i>	Alcohols	Petroleum distillates	Chlordane
Denatured ethanol or isopropanol	Chlorinated aliphatic hydrocarbons		Dichlorophene
Mineral spirits			Other chlorinated hydrocarbons

Source: U.S. Environmental Protection Agency. Report to Congress. *Solid Waste Disposal in the United States*. EPA 530-SW-88-011B, Vol. II, October 1988.

Why not pour them down the drain?

If toxic products are poured down the drain, they go into either a septic tank or a public sewer system. In the septic tank, toxics can destroy organisms which break down wastes and can pass unchanged into surrounding soil and water. If they enter a public

DUMP NO WASTE

DRAINS TO STREAM

Washington State Department of Ecology message stencilled at storm drains warns that waste products poured down them go directly to surface waters.

sewer, they may go to treatment plants not equipped to deal with them and be returned to surface waters which may serve as drinking water supplies. (More than 700 contaminants, including a large number of synthetic organic chemicals, have been detected in drinking water.)

Some products can safely be put down the drain if diluted with ample water. These are listed in a number of disposal guides. (See Resources.)

If toxic household products can't be poured down the drain, put in the trash, or poured on the ground, what can be done with them?

Special collection sites and days have been organized in many areas of the country. People are encouraged to bring their household hazardous wastes to specified sites where they are disposed of free-of-charge to citizens. An increasing number of communities have permanent collection sites. Some of the toxic products—used oil, car batteries, and paint, for example—are recycled. If no collection sites are available, products should be stored carefully until they can be disposed of safely.

Isn't it true that products wouldn't be on the market if they weren't safe?

The safety of products on the market is not guaranteed by the government, even in the case of pesticides which are required to have extensive pre-

market testing. The federal pesticide law simply states that the pesticide should have no "unreasonable adverse effects" on public health or the environment.

Is the federal government doing anything about the household waste problem?

In 1988 EPA published an "Agenda for Action" to address the solid waste crisis. In it EPA set a 25% recycling goal for the nation by 1992 and made recommendations for source reduction and other management options. This goal is low in that many communities are already recycling considerably more than that. EPA estimates that the amount of incineration will double to 20% by 1992. However, there is still concern about toxic emissions and the insufficient guidance from the federal and state governments about the management of ash.

Who is ultimately responsible for the safe disposal of household waste?

Each one of us can make a significant difference in the amount and toxicity of waste that must be disposed of, as well as in policy decisions about waste management made at the federal, state, and local



Photo: Mimi Levine

At a household hazardous waste cleanup day in Montgomery County, Maryland, over 22,000 pounds of waste were collected.

levels. At the federal level, EPA has the responsibility for the regulation of both solid and hazardous waste disposal, though hazardous waste has had top priority for federal attention for a number of years.

States whose solid waste plans have been approved by EPA have assumed the regulatory function for this type of waste. As of late 1988, 25 state solid waste plans had been approved. At the state level, solid waste management is usually a division of a



Nonbreakable items are often unnecessarily wrapped in layers of packaging materials.

department of environmental protection, health, or natural resources. States can provide guidance and funding for local waste disposal initiatives.

However, local waste management authorities—usually found in a health department or a department of public works—have the ultimate responsibility for the collection and disposal of waste and need the informed participation of each household in their decisions. Some cities have citizen advisory committees to allow public participation in waste management.

Before exploring what households and communities can do to address the solid waste issue, it might be helpful to examine some of the complex problems that decision-makers will face.

Special Problems of Household Waste

Certain components of household waste pose particular problems because of their volume, toxicity, or nondegradability. When these products are designed for recycling and reuse, their share of the waste stream will be greatly reduced.

Overpackaging

Packaging materials comprise one third (by weight) and one half (by volume) of total municipal solid waste. Of this, paper makes up the greatest share, although plastic packaging is increasing. One dollar out of every \$11 the householder pays for groceries is for packaging. Food and other products are often wrapped in several layers.

Some state and local governments are attempting to limit packaging by restrictions or total bans. Berkeley, California, for example, has banned plastic packaging made with chlorofluorocarbons (CFCs)* for prepared foods in restaurants and retail establishments. As of January 1990 any polystyrene foam for this kind of packaging will be banned in the city, and 50% by volume of the remaining plastic packaging for prepared food must be recyclable or degradable. Separate receptacles for recyclables must be available on the premises.

In the most far-reaching legislation of its kind Minneapolis, Minnesota, banned nonrecyclable food packaging from grocery stores and fast food establishments in March 1989. St. Paul passed the same ordinance in April. Packaging that is not naturally degradable, recyclable, or reusable will be prohibited after July 1990. Since plastics are not being recycled in Minneapolis/St. Paul, they are in effect banned. Opponents of this type of law feel that the states should preempt such local legislation and set a statewide policy on waste disposal in general and packaging controls in particular.³ In Italy plastic bags will be banned after 1991; Britain, Switzerland and Austria are considering similar laws.

Taxes and fees on packaging are being proposed in several states. These taxes are designed to encourage manufacturers to use recyclable packaging and, by giving them tax exemptions for packaging with recycled content, to create markets for recycled materials. They are also an effort to have the price of a product include the cost of disposal. Deposits on containers have been very successful in promoting

*CFCs are among the substances that destroy the ozone layer in the upper atmosphere.

recycling and/or reuse. A bill proposed in 1988 in Massachusetts would tax manufacturers three cents per layer on every non-food package.⁴ Similar legislation is being considered in Connecticut, Rhode Island, Maine, Vermont, California, New Jersey, Illinois, and New York.

Proliferating Plastics

Plastics now constitute 25-30% of the volume of municipal solid waste, a percentage that is expected to grow as plastic products continue to be substituted for those made from natural materials. In 1982 only five percent of grocery bags were made of plastic; by 1986, 38%.⁵ Plastics production in the US is expected to increase from about 50 billion pounds in 1988 to 75 billion by the year 2000.⁶

While plastics have provided a growing population with numerous new products, they present certain problems to the environment and public health. Their manufacture requires toxic materials and large quantities of a nonrenewable resource—petroleum—and, as in the manufacture of paper, produces toxic

gases and wastes which can contaminate air and water and threaten human health.

Many plastics give off vapors which can at the least affect the health of the chemically-sensitive. Plasticizers used to increase flexibility in some plastic food wraps can, under certain circumstances, leach into foods and beverages.⁷

Plastics also present problems for disposal. Their incineration produces toxic gases, and landfilling them causes problems because of their volume and toxicity. They can take up three times as much space in a landfill as other materials of equal weight.⁸ A 1989 EPA study estimates that plastics contributed 28% of the cadmium found in municipal solid waste in 1986 and two percent of the lead.⁹ Many are used for a very short time—sometimes a matter of a few minutes—yet will last for hundreds of years. In addition, as litter in the ocean they are responsible for the deaths of hundreds of thousands of seabirds and marine animals.

The process of recycling post-consumer plastics can be complicated. Repeated heating compromises the

The Biodegradability Issue

In response to public concern about waste and to threats of packaging bans or restrictions the plastics industry is beginning to develop biodegradable and photodegradable products such as garbage bags, bottles, and cups. The Government Accounting Office reports, however, that little effort, either by government or the private sector, is being put into developing standards of performance or basic definitions of biodegradability and that practically no testing of biodegradable plastics has been done.

Proponents claim that biodegradability will help to solve the waste problem and that it can contribute to the reduction of litter and the protection of wildlife. Sixteen states now require that six-pack yokes be biodegradable and a federal bill has been passed, which becomes effective in 1991, directing EPA to require that all six-pack yokes distributed in the US be biodegradable.

Critics believe, however, that drawbacks far outweigh the benefits of biodegradable plastics.

When placed in landfills where even naturally degradable products such as paper may remain intact for as long as 20 years, biodegradable plastics will also break down very slowly. Many do not completely degrade; they simply disintegrate into smaller pieces of plastic. Chemicals released in the degrading process and/or the residue of degradation may contribute to air, soil, and groundwater contamination. For example, many plastics contain additives such as heavy metals and stabilizers. What happens to these additives when the product degrades is not known.

Critics also note that there is a danger of premature disintegration of degradable packaging with possible contamination of the contents; in other words, the very sturdiness that has made plastics attractive would be compromised. Plastics recyclers have expressed reservations because the inclusion of degradable plastic products in scrap can lower the quality of the secondary product.

Sources: US Government Accounting Office. *Degradable Plastics: Standards, Research, and Development*. GAO/RCED-88-208, September 1988. "Plastics Recycling News." *Resource Recycling*, September/October 1988.

qualities of toughness and flexibility. Each type of plastic resin has different physical and chemical qualities which can restrict the possible eventual uses of the recycled plastic.¹⁰ To facilitate the separation of plastics by type for recycling, the plastics industry has developed a coding system. Several states, including Michigan, Connecticut, Wisconsin, Minnesota, and Florida, have passed mandatory coding laws. In part because of fears of bans or restrictions on the use of plastic, the plastics industry supports recycling, but simultaneously some companies are producing items which hinder it. Aseptic packaging, for example, used to make small containers for fruit juice and other products, looks like paper but is actually a sandwich of cardboard, aluminum, and plastic, and therefore cannot be recycled.¹¹

An unresolved deterrent to plastics recycling has been the Food and Drug Administration's ruling that if recycled plastics are used to package food, manufacturers must guarantee that they contain no contaminants. Since plastics cannot be reheated to temperatures high enough to assure non-contamination, they are not reused for food packaging at the present time.¹²

Many communities that already support the recycling of glass, metals, and paper are weighing the merits of adding plastics. While at present only about 1% of plastics is being recycled, the plastics recycling picture changes from day to day. New processes are being developed rapidly. While in the past plastics could not be recycled and emerge again as the same product, new processes can, for example, turn used plastic bottles into new ones. Others can accept mixed, or commingled, plastics, although products made from single resin plastics—such as polyethylene terephthalate (PET) soft drink bottles—have greater economic value. A recent sharp rise in the price of ethylene, the main ingredient in virgin plastic, may constitute an economic incentive for plastic recycling and cause manufacturers who use plastics to turn to recycled ones.¹³

The responsibility for the disposal of plastics must ultimately fall on industry and citizens alike. Like other materials, plastics must be manufactured so that they can be easily reused or recycled, thus conserving scarce landfill space, valuable petrochemical resources, and energy. The environmentally-aware citizen should make every effort to use a reusable product whenever possible, to generate as little plastic waste as possible, and seek to assure that those plastic products which are manufactured are recycled.



Photo: National Association of Diaper Services

Cloth diapers are used hundreds of times before being discarded, disposables only once.

Disposable Diapers

Discarded disposable diapers are a special problem because of their volume in the waste stream. Despite their cost, which can run to \$850 per baby per year, 80% of American babies wear disposables. Eighteen billion diapers were discarded in 1987, comprising an estimated 2-4% by weight of the municipal waste stream. Only two other single items constitute greater portions: newspapers (6.8%) and beverage containers (5.5%).¹⁴

A recent study found that some 10% of disposable diapers contain viruses and that fewer than five percent of consumers are estimated to flush away the waste matter on diapers before putting them in the trash.¹⁵ This means that raw sewage is carried to landfills where it can leach into groundwater. Whether or not the presence of discarded disposable diapers in landfills is actually a health problem has not been determined.

Several companies are now marketing diapers with so-called biodegradable liners, but, as with other biodegradables, the eventual effects on the environment of the disposal of this kind of diaper are unknown. Other suggestions dealing with the diaper waste problem include the co-composting of disposable diapers with organic solid waste, taxes on disposables, the development of a flushable single-use

diaper which would have a reusable liner, and a return to the use of cloth diapers.¹⁶ Economic considerations are bringing about an upsurge in the cloth diaper service business. Diapers from a service cost about 13 cents per use compared to about 22 cents for disposables.¹⁷ The least expensive and most environmentally-sound alternatives are to use a diaper service or to buy cloth diapers and wash them at home.

Throwaway Batteries

The three billion household batteries sold each year in the US contain mercury, zinc, manganese, nickel, and cadmium. The New York State Department of Health has estimated that the 230 million household batteries sold in the state in 1985 contained over 5000 tons of heavy metals.¹⁸ At present most household batteries are landfilled or incinerated. Studies have confirmed that the number of household batteries put into municipal incinerators strongly affects the level of mercury, cadmium, zinc, manganese, and nickel

emissions from those incinerators and the concentration of these metals in the ash.¹⁹ New York is the only state which has passed a law forbidding the incineration of household batteries.²⁰

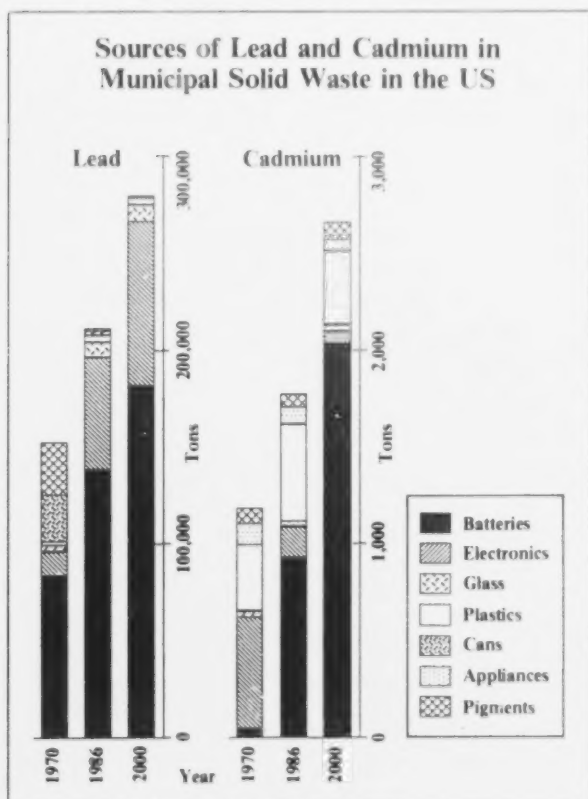
Because of concerns about the effects of household batteries on the environment and human health, Japan and Sweden have programs to remove household batteries from the waste stream. They are either recycled, stored, or sent to hazardous waste landfills. In Switzerland they are handled as hazardous waste.²¹ At present, technologies for recycling most household batteries are not economically feasible in the US due to the difficulty of collecting large quantities and of separating the various types. However, a few programs to separate household batteries have been attempted. A joint New Hampshire/Vermont project involving 26 municipalities has collected nine tons of batteries since its inception in 1987. The project markets batteries containing mercury and silver to recyclers and stores the remaining batteries for the next household hazardous waste collection day.

Used Oil

Used oil contains toxics such as heavy metals (lead, chromium, and cadmium), naphthalene, chlorinated hydrocarbons, and other organic chemicals. Of the 200 million gallons of used oil drained from cars each year by car owners, less than 10% is recycled.²² A valuable resource, it can be reused as fuel or re-refined for use as a lubricant.

By disposing of used oil properly, the householder can help reduce the hazards it poses to the environment, particularly the contamination of groundwater. One gallon of used oil from a single oil change can contaminate one million gallons of fresh water—a year's supply for fifty people.

Many communities and states have organized successful used oil collection programs. In Sunnyvale, California, used oil has been collected at the curb along with other recyclables since 1984. Approximately 75 to 120 gallons of used oil are collected each day from 28,000 homes; during the 1987-88 fiscal year a total of 27,139 gallons were collected. Residents are provided with gallon jugs in which to put their used oil. When the jug is picked up, a replacement is left for the next oil change. To inaugurate the program the Mayor changed her oil in front of City Hall. The program was also promoted by numerous newspaper articles, informational brochures, posters, and inserts in water bills.²³



Source: U.S. Environmental Protection Agency. *Characterization of Products Containing Lead and Cadmium in Municipal Solid Waste in the United States, 1970 to 2000*. EPA 530-SW-89-015B, January 1989.

Education campaigns targeting the automobile owner play an important role in the success of used oil recycling programs. They include discussing used oil recycling in drivers education and auto mechanics classes, incorporating information in car manuals, and including a question pertaining to used oil recycling on the driver's examination.

**When
Changing
Your Oil...
Dispose Of It
Properly At
Stations
Displaying
This Sign**



Source: Alabama Department of Economic and Community Affairs and the University of Alabama

The EPA is currently re-evaluating its present nonhazardous listing of used oil, including automotive oil, which was initially established so as not to discourage recycling. A hazardous listing would likely result in a ban on used oil disposal in municipal landfills. Such a ban already exists in a number of states.

Scrapped Tires

An estimated 240 million automobile and truck tires are discarded each year in the US and disposed of in landfills, stockpiles, and backyards. They are extremely durable—their life span off the road far exceeds their three-to-four-year road life. In landfills they do not decompose, taking up valuable space and creating air pockets where noxious gases can develop. Rather than compress, they gradually work their way to the surface.

As a result of dwindling space, many landfills either ban tires entirely or charge high fees for their disposal. As a result, collection in some cases has been left to private junkyards, many of which have amassed large stockpiles of tires. Stockpiling has proven to be an inadequate response to the disposal problem. Thirty-four stockpiles have been identified which contain at least 100,000 tires within 100-150 miles of a major

metropolitan area.²⁴ More than just eyesores, they pose significant health risks and environmental hazards. They provide breeding grounds for mosquitos which transmit diseases such as dengue fever, encephalitis, and dog heartworm. Stockpiles are also susceptible to fire.

Tires will be banned from Florida landfills as of June 1989 and a ban in Minnesota is already in effect. A number of other states are considering the regulation of tire disposal. As a result states are being forced to devise plans for alternative tire collection and disposal and for the cleanup of existing sites. By providing grants and loans to businesses engaged in tire recycling, in some cases funded by deposits or fees, states can insure not only the safe transport and collection of tires, but also their eventual processing into usable products.

Used tires can be a valuable resource. Each tire is made up of roughly 40% rubber, most of which is recoverable.²⁵ However, rubber is reclaimed from only five percent of discarded tires.²⁶ Recycled rubber can be used to make building materials, irrigation piping, and paving material. It can also be added to virgin rubber and plastics to produce a variety of products such as laundry baskets, mud flaps, and grocery cart wheels. Certain industries use discarded tires as fuel to produce energy, causing the same problems that accompany the mass burning of household trash—



Photo: Maggie Knaus

Tires which could be retreaded or recycled accumulate in waste piles throughout the US.

dangerous emissions and disposal of ash.

The remainder of the tire—steel belts, bead wire, and sidewall—can also be recycled. Retreading is another form of recycling. In 1987, 16.5 million passenger car tires, roughly nine percent of those discarded, were retreaded. However, this number is expected to shrink due in part to less expensive new tires. Furthermore, only a quarter of all passenger tires are suitable for retreading because they have not been kept properly inflated and aligned. Because of better maintenance, retreads have been used successfully and cost-effectively by airlines, taxi fleets, and trucking companies.

Discarded Appliances

In the past discarded refrigerators, stoves, air conditioners, and other appliances, called "white goods," have been used along with old automobiles and other discarded metal to produce scrap metal which is then sold to steel companies to make new iron and steel. The shredding process creates a by-product, or fluff, which in some instances has been found to contain polychlorinated biphenols (PCBs) at levels higher than that allowed in municipal landfills. The PCBs are contained in the capacitors of air conditioners, microwaves, fluorescent lights, and some other appliances manufactured before 1980.

In 1988 EPA ruled that fluff containing more than 50 parts per million of PCBs must be disposed of as hazardous waste, which is more expensive than managing it as municipal solid waste. While the capacitors are fairly easy to remove, many scrap metal recyclers now refuse to accept any motor-driven appliance claiming that landfilling fluff in a hazardous waste site is prohibitively expensive and that it is difficult to identify which appliances contain PCBs. (Capacitors themselves, if not leaking, can be sent to a municipal landfill.)

Unrecycled Automotive Batteries

Automotive batteries each contain about 18 pounds of lead and about a gallon of corrosive sulfuric acid. For this reason, discarded storage batteries have been classified as hazardous waste since January 1985. Virtually 100% of the used batteries that are returned to gas stations and battery dealerships are recycled.²⁷ However, the total number of those recycled has



Roadside dumping includes discarded appliances and other household goods.

decreased since its peak of 97% in 1965 to about 80% at present. This decline is due both to reduced prices for lead and to government environmental regulations (and the threat of Superfund liability) which have resulted in the closure of a number of secondary smelters and other facilities in the recycling chain.²⁸

Several states, including Florida, Pennsylvania, and Minnesota, have banned lead-acid batteries from their landfills. California, Florida, Minnesota, Rhode Island, and New York prohibit their incineration.²⁹ Rhode Island and Massachusetts require deposits on them, and Minnesota is considering such a requirement. California has placed strict regulations on the management and transport of used batteries resulting in a sharp decrease in the number of scrap dealers that handle them.³⁰ Innovative solutions are needed to assure maximum recycling without sacrificing the control of lead in the environment.

What Individuals Can Do

Household waste is a problem for us all. While many may find it difficult to give up products which we consider time-saving and convenient, each of us, as we become more aware of the ways in which what we buy and use can affect the environment and our health, can gradually alter our habits. This section suggests how individuals can address the waste problem, become involved in community efforts, and use consumer demand to persuade industry to respond to the crisis.

Conduct a Household Waste Audit

Determine what kind and what amount of materials are discarded each week from your household. Determine whether your community is recycling any of these materials. If not, consider how they might be reused at home. Calculate how much organic waste your household produces. Consider composting it rather than putting it down your disposer where it contributes to nutrient overload, which can lead to oxygen deprivation in rivers and streams.

Go through each room in your home and itemize the number of toxic products in each. These could include pesticides, paints, cleansers, polishes, prescription drugs, and cosmetics. Find out whether your community periodically holds a collection day where citizens can take these products for safe disposal. If not, request that your community establish one.

Choose Products that Minimize Waste

Household waste can be significantly decreased by finding ways to generate less, and less toxic, waste in the first place. In industry, source reduction means altering manufacturing processes or substituting non-toxic materials for hazardous ones. For the household, it means: buying only the amount you need; using products that have long life or that can be repaired; avoiding disposables like paper or plastic cups and utensils, cigarette lighters, razors, diapers, and flashlights; using non-toxic products; and buying the least packaged item. Each of these approaches saves energy and raw materials and cuts down on environmental pollution. They can also save money. Using a diaper service, for example, costs less than using throwaways. While recycling is both economically and environmentally sound in that valuable resources are reused, source reduction is even better in that resources are not used at all.

Recycle

Most household waste is potentially recyclable. The household contribution to recycling is a critical one involving basic changes in attitudes and habits. Many people are learning to treat their garbage as a resource and to separate the valuable components for processing or reuse. In some US communities, paper, glass, and metals have been collected from households

Household Hazardous Materials Audit												
Laundry/Utility Room Checklist Is it stored properly? Yes No ☐ ☐ Spot remover ☐ ☐ Starch spray ☐ ☐ Starch granular ☐ ☐ Bleach powder ☐ ☐ Bleach liquid ☐ ☐ Moth balls ☐ ☐ Furniture polish ☐ ☐ Carpet & upholstery shampoo			Kitchen Checklist Is it stored properly? Yes No ☐ ☐ Scouring powder ☐ ☐ Oven cleaner ☐ ☐ Ammonia ☐ ☐ Floor cleaner ☐ ☐ Metal polish ☐ ☐ Roach kill ☐ ☐ Rodent kill			Bathroom Checklist Do you have? Yes No ☐ ☐ Drain opener powder ☐ ☐ Drain opener liquid ☐ ☐ Toilet bowl cleaner powder ☐ ☐ Toilet bowl cleaner liquid ☐ ☐ Disinfectant ☐ ☐ Mildew remover ☐ ☐ Medicine ☐ ☐ Infectious wastes ☐ ☐ Hairspray ☐ ☐ Hair color ☐ ☐ Home permanent ☐ ☐ Nail polish ☐ ☐ Nail polish remover			General Household Item Checklist ☐ ☐ Air freshener ☐ ☐ Glass cleaner ☐ ☐ Household insecticides ☐ ☐ Flea collar, shampoo, spray, powder ☐ ☐ Smoke detector (ionizing type) ☐ ☐ Fluorescent light fixture — ballast ☐ ☐ Spent batteries			
Garden Supplies Checklist ☐ ☐ Herbicides ☐ ☐ Insecticides ☐ ☐ No-pest strip ☐ ☐ Insect Repellent			Home Office Checklist ☐ ☐ Typewriter correction ☐ ☐ Photographic chemicals (Developing bath, stop & fixing baths) ☐ ☐ Artist paints, ink, gouaches, watercolors, acrylics			Automotive Supplies Checklist ☐ ☐ Used motor oil ☐ ☐ Antifreeze ☐ ☐ Used car batteries ☐ ☐ Brake and transmission fluid ☐ ☐ Engine degreaser ☐ ☐ Carburetor cleaner ☐ ☐ Gasoline			Garage/Workshop Checklist ☐ ☐ Oil-based paints ☐ ☐ Paint thinner ☐ ☐ Lacquer, varnish ☐ ☐ Paint stripper, finish remover ☐ ☐ Waterless handcleaner			

Source: Alaska Center for the Environment

for many years. As the landfill squeeze becomes severe, more communities are choosing to recycle, and other materials, including plastics, are being added to the effort. Several states and many communities have made separation and collection of recyclables mandatory.

● **RECYCLE. Do it Right from the Start!**



The Precycling Program of Berkeley, California, advises consumers about ways to reduce waste before it is created.

Reduce the Use of Toxic Products

Consumers can reduce the generation—and thus the disposal—of toxic waste by the selection and use of non-toxic products. Toxic products when discarded are a threat to the environment and human health. They are also dangerous to have in the home. Some are toxic when inhaled, others when ingested; children are particularly at risk from the improper storage of such materials. Still other products are ignitable, corrosive, even explosive.

Products vary widely in the degree of their toxicity. Oil-based paint, paint thinners, and paint strippers are very toxic and are dangerous if disposed of on the ground or into surface waters. Other household products, such as detergents, may contain small amounts of toxic ingredients but are much less of a threat. Consumers should attempt to eliminate the most hazardous products first.

Pesticides, for example, are designed to kill insects or weeds and thus many of them are very toxic. Many of the pesticides used around homes have not been fully tested for effects on human health. The University of Wisconsin Cooperative Extension Service recommends that certain extremely toxic pesticides not be used at all. These include aldrin, chlordane, DBCP, DDT, dieldrin, endrin, heptachlor, kepone, lindane, mirex, silvex, toxaphene, and

2,4,5-T. (All of these pesticides have been banned for most or all uses by EPA. In some cases, however, remaining stocks have been allowed to be sold for certain commercial uses. Additionally, many of those used in the past may have been stored and forgotten in US households.)

Eliminate or reduce the use of pesticides inside the house. Good housekeeping—wiping up spills, keeping food in sealed containers, sealing cracks in the kitchen and bathroom, and keeping window and porch screens in good condition—can discourage insects. Non-toxic strategies to control roaches and other indoor pests are available.

Cut down on pesticides used in the yard. Non-toxic products are available for use on shrubs and trees. Hand-weeding can reduce the use of herbicides. Homeowners can also learn to live with a less-than-perfect, not totally weed-free lawn. (See Guidelines and Selected Reading.)

Alternatives to Toxic Products Used in the Home

Instead of this	Use this
Ammonia-based cleaners	Vinegar, salt, and water mixture; baking soda and water
Abrasive cleaners	1/2 lemon dipped in borax.
Floor or furniture polish	1 part lemon juice, 2 parts olive or vegetable oil.
Silver cleaners	Boiling water with baking soda, salt, a piece of aluminum.
Toilet cleaners	Baking soda, toilet brush.
Disinfectants	1/2 cup borax in 1 gallon water.
Drain cleaners	1/4 cup baking soda and 1/4 cup vinegar in boiling water.
Rug/upholstery cleaners	Dry cornstarch.
Mothballs	Cedar chips, lavender flowers.
Enamel or oil-based paints	Latex or water-based paints.
Furniture strippers	Sandpaper.
House plant insecticide	Dishwater or bar soap and water.

Adapted from: Household Hazardous Waste Wheel. Environmental Hazards Management Institute, P.O. Box 932, Durham, NH 03824. (800) 446-5256

Compost Organic Wastes

Composting is a means of recycling organic wastes such as leaves, grass clippings, and fruit and vegetable scraps by combining them in an open pile or a container so that they decompose through microbial action into humus. Since 20-30% of household waste consists of organic wastes, composting makes good environmental and economic sense. It is not necessary to live in the country to compost. Anyone with a small city lot which yields some garden or yard wastes can mix these with kitchen scraps to produce material which will enrich garden soil and fertilize plants.

How to Compost

A successful compost pile consists of five ingredients: organic materials (leaves, plant trimmings, vegetable and fruit scraps, coffee grounds, and egg shells, etc.), nitrogen-rich materials (grass trimmings and fresh plant clippings), bacteria, moisture, and oxygen. A variety of materials will result in compost with a higher nutrient content. Meat, bones, grease, fat, oils, large amounts of paper and wood should not be included.

There are two basic types of composting: the "hot" or rapid method which produces humus in several weeks, and the "cold" or slow way which takes three to six months. Hot composting takes more space—a pile should be at least four cubic feet in order to produce enough heat for rapid decomposition—and requires more work gathering materials and turning them regularly. Many pamphlets are available describing the balance and type of materials, the various sizes and kinds of bins and piles, and the methods of aeration needed for hot composting. (See Resources.)

Those who do not need lots of compost and who do not have space for several bins or piles will probably be content with slow composting of small amounts of materials. The simplest way is to make a pile of yard wastes, trying to balance the amounts of green (fresh) and brown (dead) materials, and add kitchen scraps regularly. Chopping or cutting everything into small pieces helps to speed decomposition. Food scraps may be put through a food processor. It also helps to turn the pile from time to time to aerate it. The more time and attention that is given to the process the better the product will be and the sooner it will be ready. People who have very little space, or are living where animals may disturb an open pile, will probably want to use small bins. These may be constructed or ordered from garden supply stores.

Reuse and Repair Whatever Products You Can

Many products have short lives and/or built-in obsolescence. Repairing them can cost more than buying a new product. There are, however, some products that can and should be repaired and reused if the parts can be found. Vacuum cleaners, television sets, air conditioners, and irons are among those products which often can be repaired for much less than what a new one would cost. Contact the company that manufactured the product or check the Yellow Pages under Appliances - Household-Major - Service and Repair, or Appliances - Household - Small - Service and Repair. Do some comparative shopping for repairs and do not be persuaded that the cost of repairs necessarily makes buying a new product the better option. Sometimes more durable items are more expensive. Shoppers should take into account long-term costs. Also, buy items with good warranties.

"As individuals, we don't exist in isolation. Every action we take has consequences. If we buy a toxic product, we are responsible for its use as well as for the waste produced when the product is manufactured and when it's discarded."

Debra Dadd,
New Age Journal

Support Efforts to Develop Environmentally-Sound Products

Either through the marketplace or through legislation, industry can be encouraged to reduce packaging, use more recycled materials, produce fewer disposables, and make products with longer lives and which are repairable. If a significant number of informed consumers reject products which are non-recyclable, over-packaged, or which present particular disposal problems, industry may be persuaded to make substitutions. For example, as a result of public pressure and government regulation, most of the CFCs in polystyrene packaging have been replaced with a less polluting substitute.

What Communities Can Do

Organize Household Hazardous Waste Collection Days

On designated days in many communities, local residents can take such household toxics as used oil, leftover pesticides, oil-based paints, and cleansers to a collection center where they are identified, packaged, and recycled or sent to specified hazardous waste disposal sites. By 1988, over 1300 programs had been established in 44 states.



Photo: Mimi Levine

Recycling used oil saves energy and protects the environment.

Such programs have increased public awareness and collected a substantial amount of hazardous waste which would otherwise have gone to a municipal landfill or incinerator. In Florida between 1984 and 1987, approximately 12,000 people participated and almost 1,600,000 pounds of household hazardous waste were collected. About 30 areas in the US now provide permanent collection sites. They include San Francisco and San Bernadino, California; Anchorage, Alaska; Duluth, Minnesota; Ingham County, Michigan; and King, Thurston, and Whatcome Counties, Washington. (See Resources for guides to establishing collection days.)

Establish Community Composting Facilities

The same basic composting principles that are used on a small scale by households have been applied community-wide. Depending on the location, yard wastes can comprise up to 30% of municipal solid waste. As states move to ban yard wastes from

landfills, composting programs are proliferating. The finished compost can be marketed and sold, used for soil enrichment in the community itself, or shared with those citizens who contributed their yard waste. Money is saved through avoided tipping fees and through elimination of the need to purchase commercial fertilizers; valuable landfill space can also be preserved.

Initiate Recycling Programs

Some community recycling programs begin with one material—newspapers, for example—and, once established, are expanded to include metals, glass, even plastics. Others have started separating and recycling several materials at once. According to a magazine survey, there are more than 1000 curbside recycling programs nationwide and more than 650 yard waste composting programs. Three states have more than 100 curbside recycling programs: New Jersey, Pennsylvania, and Oregon.³¹ A pilot program conducted in East Hampton, New York, achieved an 84% recycling rate by separating paper, glass, metal



CLEAN-UP DAY

RAIN OR SHINE

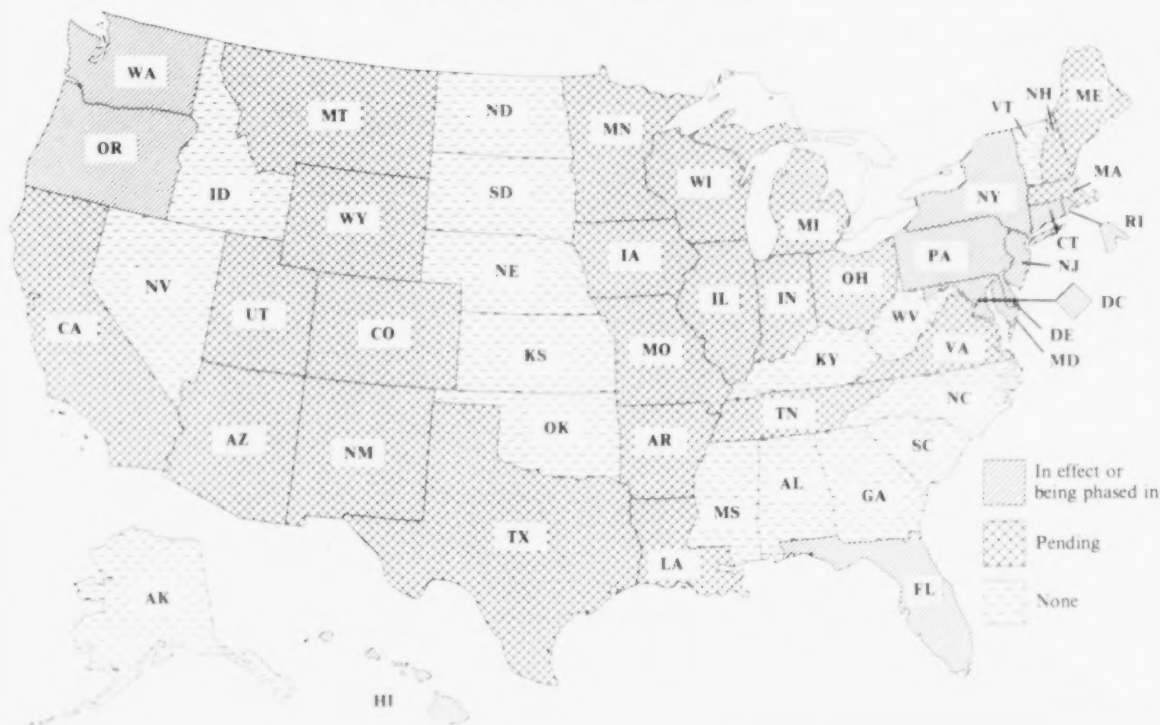
AT MONTGOMERY
COUNTY'S
SOLID
WASTE
TRANSFER
STATION

Route 355 and
Shady Grove Road

Sunday, September 13th
1987
9:00 a.m. to 3:00 p.m.

Source: Montgomery County, Maryland,
Department of Environmental Protection

Statewide Recycling Legislation*



*Voluntary or locally-initiated programs not included

Source: The National Solid Waste Management Association

cans, and food waste. Seattle has a goal of 60% recycling by 1997. New York City began a recycling program in 1989 which will eventually include newspapers, bottles, and cans. Many manuals are available on how to organize a recycling program. (See Resources.)

The nine states that have deposit legislation ("bottle bills") have achieved the highest container recycling rates. It is estimated that this has resulted in a 6-8% reduction in the solid waste stream. Michigan credits its bottle bill with a seven percent reduction, savings of \$250 million in landfilling costs, and an increase of over 4,000 jobs. A national bottle bill has been proposed.³² The next most successful type of recycling procedure has been mandatory curbside recycling.

Markets are an essential component of a successful recycling program. If there is a lack of outlets for recycled materials, the establishment of these facilities can provide an opportunity for community economic development. Through financial incentives such as tax credits or loans, investors can be encouraged to support the creation or relocation of enterprises that will accept used materials and turn them into finished

products—a paper mill, for example, which will buy used office paper and convert it into newsprint. The community thus benefits by the expansion of the job market, the reuse of valuable resources, and the reduction of waste. Oregon was the first state to provide tax credits for companies using recyclable materials. Several states have since passed tax credit provisions; a few are providing low interest loans and/or sales tax exemptions. Some states have initiated procurement programs which require the purchase of recycled goods and/or cooperative marketing programs.

Recycling can work not only in urban and suburban areas, but in rural communities as well. A study by The Minnesota Project found rural recycling programs to be successful in a variety of localities including farming and residential. It found recycling to be most successful when run by the local government in order to reduce waste management costs and when collection for recycling was handled by those already involved in trash collection and disposal. Several methods can be used: curbside, drop-off boxes, and collection centers.³³

Innovative Programs

Community Leaf Composting

Montgomery County, Maryland, has chosen composting as an economical and efficient way of dealing with the disposal of its leaves. Yard waste pickups in the spring and fall account for about 17% per year of Montgomery County's municipal solid waste and peak at about 30%. The 42-acre composting facility, one of the largest in the country, turns leaves into a high-quality organic soil conditioner which is sold in bulk to landscapers and horticulturists. About 8,000 tons of screened compost are produced annually from 16,000 tons of leaves. Environmental impacts are monitored; there are no odors or air emissions; no water runoff quality problems have been detected. Keeping plastic debris out of the compost, however, has been a major problem. For additional information, contact the Maryland Environmental Service, 2020 Industrial Drive, Annapolis, MD 21401, (301) 261-8596.



Aerial view of leaf composting facility at Dickerson, Maryland.

Source: Maryland Environmental Service



The leaves are shredded and mixed for uniform composting.

Source: Maryland Environmental Service



Environmental product labels from Canada, Japan and West Germany.

Reprinted with permission of *Resource Recycling*, P.O. Box 10540, Portland, OR 97210

"Environmentally-Friendly" Products

While some environmentally-sound shopping choices are obvious—buying a durable product over a disposable one, for example, or buying goods packaged in recycled materials—many are much more difficult. In Canada, Environment Canada has established a voluntary program to enable shoppers to make informed decisions about the products they buy. An "Environmental Choice" symbol is to be placed on those products which are environmentally sound, along with information as to why they so qualify. A panel of environmentalists, consumer advocates, and businessmen are developing criteria upon which products will be evaluated. Physical, chemical, ecological, and socio-economic effects of production, use, and disposal are considered. The first products proposed for the new logo are re-refined motor oil, insulation material made from recycled paper, and selected household and office products made from recycled plastic. Manufacturers who submit products for approval anticipate that this symbol will increase sales and are willing to pay an annual fee of up to \$5000 for the right to use it.³⁴

Canada's program is patterned after the West German "Blue Angel" one which has been in operation for 10 years and which has approved some 2,250 products in 50 categories including retreaded tires, recycled paper, reusable packaging, and spray cans not using CFCs. For further information, contact Environmental Choice, Environment Canada, Place Vincent Massey, Ottawa, Ontario, Canada, K1A 0H3, (819) 994-0744.



Source: Austin Parks and Recreation Department,
Forestry Division

Christmas Tree Recycling

Some 100 communities in the US have undertaken Christmas tree recycling programs and found them highly successful and easy to run. For the last four years Austin, Texas, has turned Christmas trees into mulch for city landscaping projects, saving more than \$20,000 per year in collection and disposal costs alone. In 1987 nine collection sites received about 17,000 trees, estimated at about a third of all the Christmas trees sold in the city. A particularly attractive feature of the program is that each citizen who turns in a Christmas tree receives a free seedling in return. Some 500 volunteers staff the sites, helping to unload the trees, accepting donations, and giving out the seedlings. All services are donated. The city organizes the program and cleans up the sites once the project is completed. Programs like Austin's are short-term, inexpensive to run, and serve as public education strategies because of their high visibility. For further information, contact City Forester, Parks and Recreation Department, 2525 South Lakeshore Boulevard, Austin, TX 78741, (512) 445-4414.

Recycling Rewards

Minneapolis, Minnesota, plans to reward residents who recycle by charging them only \$7.00 per month for trash disposal while non-recyclers will be charged \$12.00. As waste disposal costs increase, the differential will increase, providing an ever-greater incentive to recycle. Those who wish to participate in the program register with the city.³⁵ Seattle, Washington, has established a similar fee structure. For further information, contact the Minneapolis Recycling Office, 207 City Hall, Minneapolis, MN 55415, (612) 348-7564.

"Toxic House" Tour

In order to draw attention to toxic products normally found in the home, the New Jersey Environmental Federation and Clean Water Fund have been running a program in New Jersey which features an environmental house tour. Large placards are placed in each room which illustrate how the toxic ingredients in household products affect health and which suggest solutions or alternatives. These displays are built to be moved and shipped easily and are available for rent to groups or corporations. Handbooks are available at the sites to guide consumers to non-polluting products. For further information, contact the New Jersey Environmental Federation, 808 Belmar Plaza, Belmar, NJ, 07719, (201) 280-8988.

The Western Washington Toxics Coalition also held educational house tours in Seattle, Washington, for two weekends in 1986. For further information or a copy of its booklet, "Home Safe Home," contact the Western Washington Toxics Coalition, 4512 University Way NE, Seattle, WA 98105, (206) 632-1545.



Source: Pennsylvania Resources Council

Environmental Shopping Program

The Pennsylvania Resources Council (PRC), the state's oldest non-profit environmental group, is sponsoring an Environmental Shopping Campaign to promote waste reduction and recycling. Shoppers are encouraged to buy products in recycled or recyclable packaging, to buy only what is needed, to reuse packages and containers, and to avoid buying overpackaged or disposable goods. The PRC urges consumers to write to manufacturers and markets to request reusable and recyclable packaging. To request a booklet or for more information, contact the Pennsylvania Resources Council, 25 West Third Street, Media, PA 19063, (800) 346-4242 (inside Pennsylvania) or (215) 565-9131 (out of state).

State Legislative Initiatives

Pennsylvania: Funding for Recycling

Pennsylvania has mandated a statewide recycling goal of 25% by 1997 and provided funding to localities to implement the program. Some 400 communities with populations over 5,000 are required to establish mandatory curbside recycling collection programs for at least three materials in addition to leaves. Beginning in 1989, grants of 90% of the start-up costs will be given to these municipalities. Subsequently, performance grants will be issued each year on the basis of materials collected, amount recycled, and population served. The program will be financed by a \$2.00 per ton fee on waste disposed of at landfills or resource recovery facilities. Other provisions of the law mandate the establishment of recycling drop-off centers at landfills and resource recovery plants, public education on waste reduction and recycling, a state government procurement plan, and a market development study. The state has made counties responsible for solid waste management planning. For further information contact the Department of Environmental Resources, Bureau of Waste Management: (717) 787-7382.

Maine: Comprehensive Waste Reduction

In 1989 Maine enacted a landmark solid waste law that sets a recycling goal of 50% of all waste by 1994. Towns that meet the interim goal of 25% by January 1992 can receive bonus grants funded by a proposed bond issue and by fees on such items as tires, stoves, and stereo equipment. Mandatory recycling is not legislated nor are the types of materials to be recycled. Other provisions include:

- expansion of the bottle bill to include all juice, wine, water, and liquor bottles;
- a ban on the "plastic can", on aseptic packaging, and on plastic six-pack yokes;
- mandatory coding of type of resin in plastic containers 16 ounces or greater;
- a requirement that retailers use paper bags at checkout counters unless the customer requests plastic.

For further information contact Office of Waste Reduction and Recycling, Maine Waste Management Agency: (207) 289-5300.

Maine Public Favors Recycling

The following poll revealed Maine attitudes about reducing waste. It was taken in late 1988 before the passage of the Maine solid waste law.

	Yes	No	Undecided
Would you			
* separate trash?	90%	5.5%	4.5%
* return used household batteries to stores?	81.5	13	5.5
* buy unbleached paper products?	78.6	13.4	8
Do you favor a			
* ban on recyclable packaging materials?	49.8	14.9	35.3
* 3-cent tax on nonrecyclable packaging?	33.9	37.2	28.9
* deposit on wine, liquor, and juice bottles?	70.9	10.9	18.2
* mandatory municipal recycling policy?	62.8	8.7	28.5

Source: Natural Resources Council of Maine

Iowa: Hazardous Household Products Program

To deal with the increasing contamination of its groundwater, Iowa passed comprehensive legislation in 1987 which included a statewide plan for management of household hazardous waste. While household pesticide use is only two percent of total pesticide use in Iowa, household application rates are thought to be higher than those for agriculture, and home users are neither certified nor trained. Under the law, retailers must buy permits to sell hazardous household products, the revenues to be used for the household hazardous waste program and grants for local recycling projects. They must also display a small warning sign next to the price information for these products and provide a brochure which describes the safe use of hazardous products, their toxic effects, safe disposal methods, and alternatives. Collection days are to be held around the state at various locations. For further information or to obtain a copy of the law, call Iowa's Groundwater Protection Hotline: (800) 532-1114.

Federal Legislation

The Resource Conservation and Recovery Act (RCRA) of 1976 regulates the management of waste to minimize effects on human health and the environment. It was designed primarily to regulate the storage, transportation, treatment, and disposal of hazardous waste. It addressed the problem of solid waste management by directing EPA to set minimum national performance standards for solid waste disposal facilities. The Hazardous and Solid Waste Amendments of 1984 directed EPA to address some key protection provisions omitted in this process. To do so, EPA proposed new rules in August 1988 which specify additional location restrictions, require groundwater monitoring, and outline corrective action for those sites not meeting the performance standards. In addition, the new rules include new requirements for closure and post-closure care of municipal solid waste landfills.

RCRA also directs EPA to provide states with funding and technical assistance to develop solid waste management plans, protect groundwater from contamination by waste, and close open dumps. However, EPA's funding for these programs steadily decreased from 1976 to 1982; in 1983 and 1984 there was no funding at all. In many cases, this resulted in stagnation at the state level. Recycling as a management option was not encouraged and was actually discouraged by the federal government's support of incineration and its failure to set an example to the states by requiring government procurement of recycled products. In 1988, twelve years after it was required by RCRA to do so, EPA published guidelines for federal government procurement of several recycled materials, an important step in assuring markets for recycled products.

Hazardous wastes from households and hazardous wastes of less than 220 pounds from small businesses are not subject to RCRA hazardous waste provisions and may therefore be placed in municipal landfills (unless banned by state law). Although wastes collected from multiple sources in a collection day are also exempt from federal hazardous waste regulation, in several states they are subject to state hazardous waste regulation. According to EPA, haulers and municipalities usually take the precaution of handling these wastes as if they were subject to hazardous waste regulation.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) of 1980 makes provisions for funding and sets regulations to clean up waste sites that are hazardous and to prevent the release of toxic materials from these sites. Insufficient funding at both the state and federal levels has limited the effectiveness of this law. Nearly a quarter of the sites listed on EPA's National Priority List for cleanup under Superfund are solid waste landfills. Very few cleanups have taken place and these are often stopgaps. 1986 amendments require permanent solutions.

The law makes hazardous waste generators liable for the long-term health and environmental effects of their waste generation and disposal. If a generator disposes of hazardous waste at a site which becomes a CERCLA cleanup (or "Superfund") site, that generator can become financially liable for the cleanup of the site.

The Safe Drinking Water Act (SDWA) of 1974 and its 1986 amendments regulate the quality of drinking water in public systems. It requires EPA to set limits for certain contaminants in drinking water based on assessments of health risk and the financial and technical feasibility of attaining those standards. Out of the more than 700 contaminants which have been detected in drinking water, including bacteria, viruses, and synthetic organic chemicals, only 30 are currently regulated and an additional 38 have been proposed for regulation. In addition, there is some question whether the levels allowed by the SDWA for some contaminants are strict enough to protect public health.

Drinking water from underground sources is protected to some extent by this law. The 1986 amendments specify that states "shall" identify potential sources of contamination and develop plans to protect areas such as aquifers that are the sole source of drinking water. As states implement plans for groundwater protection, they will have to consider the municipal landfills that serve as disposal sites for household toxic waste as potential sources of contamination. Monitoring and testing of leachate from these landfills is now required to assure that groundwater is being protected. Compliance, however, is sketchy and enforcement is weak.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), passed in 1947 and amended several times since, regulates pesticide

registration, reregistration, marketing, use, and disposal. Amendments passed in 1972 require that pesticides be registered for specific uses based on testing for long-term and short-term health effects to protect the environment and human health from any "unreasonable adverse effect." Before this, only pesticides shipped in interstate commerce were registered and no testing for long-term health effects was required. Reregistration of pesticides approved before 1972 has been a very slow process. Only a few pesticides had been reregistered by mid-1989. The vast majority have not been adequately tested for their ability to cause cancer, birth defects, and gene mutations.³⁶ In 1987 Consumers Union compiled a list of 50 active ingredients in pesticide products specifically used around the home and found that 66% have been inadequately tested to determine whether they can cause cancer, 72% to determine whether they can cause mutations, 62% whether they can cause birth defects, 64% whether they can adversely affect reproduction, and 98% whether they can cause neurobehavioral effects.³⁷ Nevertheless these pesticides remain on the market.

In addition, most pesticides contain many extremely toxic "inert" ingredients for which until very recently no testing was required. (Inert ingredients are those that enhance the active ingredient which affects the target pest.) Some 800 inerts are still unregulated.³⁸

Amendments passed in 1988 stepped up testing and re-evaluation of those pesticides lacking full health and safety data. Until this process has been completed, however, the law does not adequately protect public health. FIFRA requires that full information about the hazards, use, and disposal of a pesticide be on the label. Many products manufactured before the mid-1970s, however, have not been up-dated and are missing important disposal information. Instructions for disposal are often vague or inadequate and may not reflect the degree of toxicity of the product.

The **Consumer Products Safety Act** of 1972 established the Consumer Products Safety Commission (CPSC) and gave it the authority to ban a substance if it considers the risk of its use "unreasonable." It has done so in very few instances—carbon tetrachloride is one.

The **Federal Hazardous Substances Act** of 1960 established labeling requirements for consumer products containing hazardous substances. Those household products, other than those regulated by

EPA and the Food and Drug Administration (FDA), are regulated by CPSC. The manufacturer has responsibility for assuring that information on the label is correct and is subject to criminal penalties if it is not. The act is directed solely at acute effects. Front labels must include a warning and a description of the hazard. A statement telling users how to avoid the hazard and safe use instructions must appear. The rules for labels are vague, however, and many labels are misleading if not dangerous.³⁹ Safe use and first aid instructions may be inadequate. Disposal instructions are not required.

"The cumulative waste management decisions made by local and national governments affect global energy balances, the rate at which the atmosphere warms, and the amount of pollution emitted into the environment."

Cynthia Pollock Shea
"Realizing Recycling's Potential"
State of the World 1987

The **Food, Drug, and Cosmetic Act** of 1938, which has been amended repeatedly, prohibits the sale of "adulterated" or "misbranded" foods, drugs, devices, or cosmetics. The FDA has responsibility for cosmetics but cannot require registration or pre-market testing. Certain ingredients are prohibited. It has established rules for labeling but must obtain a court order to have any cosmetic taken off the market. Disposal instructions are not required.

Drugs are more stringently regulated. The act prohibits the misbranding or adulteration of any drug and requires FDA review and approval before any new drug can go on the market. This approval is based on scientific testing for safety and effectiveness. All drugs marketed in the US must be listed and all manufacturers registered with FDA. There are specific labeling instructions but none for disposal.

Guidelines for Action

Conduct a Household Waste Audit

- Count the number of glass, metal, and plastic containers you throw out per day, per week. Does your community collect them at curbside for recycling or is there a recycling center where you can deliver them yourself? Can you reuse any of them? For example, food can be stored in the glass jars that otherwise would be discarded.
- Count the number of newspapers and magazines you throw out each week. Is there a community newspaper recycling program? Does it accept magazines as well? Are there schools, hospitals, or nursing homes nearby which might welcome your old magazines?
- How much organic waste does your household produce? How much of it—peelings, rinds, etc.—could be composted?
- Do you have commercial household maintenance products in your kitchen? your bathroom? your garage? Make a list and try to identify those that are toxic. Find out from your local waste management authority which ones can be safely poured down the drain with lots of water. What does it suggest for the others? What is its recommendation for disposal of prescription drugs? Does your community have collection days for household hazardous waste? a permanent collection site? If not, store these products until proper disposal options become available or give to other households or organizations that can use them.
- How many bags of leaves do you collect during the fall months? Does your community collect them for composting? Could you compost them yourself? In the spring and summer, do you rake up grass clippings? How many bags do you collect each time you mow? Consider leaving grass clippings on the lawn where they provide protection for your grass from the sun and nutrients to the soil.

Reduce the amount of waste your household generates

- Buy only what you need and use it up.
- Buy the large size or use concentrates.
- Buy products that have long lives. Avoid disposables like paper plates and cups. Especially avoid plastic disposables since they do not degrade. Particularly unnecessary are plastic disposables like razors, lighters, flashlights, tampon applicators.
- Choose products that are recyclable in your community. If you can identify it, avoid multi-resin plastic packaging which is difficult to recycle. (Squeezable bottles are an example of this kind of packaging.) States are beginning to require coding as to resin type on plastic containers.
- Buy the least packaged item. Buy in bulk. Choose paper bags over plastic. Better yet, bring your own bag or container. Choose reusable containers, especially glass over plastic. If you live in a state which has a bottle bill, choose returnable bottles over non-returnable. Refuse double bags; reject sets of cereal boxes and aseptic packaging. Refuse individually packaged screws or nails. Choose products that are packaged in recycled materials. You can identify these by the recycling symbol on the package.
- Avoid multi-material packaging. Buy products in glass, recycled paper or cardboard, and aluminum rather than plastic. Refuse extra bags for refrigerated products. Keep pressure on food outlets to provide environmentally-sound options for the consumer. Support bottle bills and legislation to restrict or ban forms of packaging which are particularly damaging to the environment. Use cotton diapers.

Reuse what you buy

- Line your trash cans with paper or plastic grocery bags. If you acquire plastic bags when vegetable or fruit shopping, use them to cover dishes in your refrigerator rather than buying plastic wrap for that purpose. If your community collects newspaper for recycling, use your paper grocery bags to store them and carry them to the curb.
- Use glass containers to store food, hobby supplies, nails, leftover paint. Coffee cans and plastic jars also have many storage uses. Plastic containers can be used to start seedlings, for example. Find out if a nearby school can use them to store art supplies. Make rags of old clothing to use instead of paper towels. Reuse whatever possible: for example, "disposable" plastic cups and envelopes.
- Donate your old clothing and/or furniture to charitable organizations which can refurbish them, if necessary, and sell them. Some communities have special days when large items may be disposed of free-of-charge. Often these items are picked up by others before the trash truck arrives. One household's junk may be just what another household needs.

Recycle what you can

- Find out if your community is recycling aluminum, paper, glass, plastic, or used oil. Does it collect these materials at the curb, or do you have to deliver them to a recycling center? Does it require that you separate your jars, cans etc.? Does it provide containers for this purpose? If you are pressed for space, consider buying stacking boxes to store your recyclables.
- If your community is not recycling, consider starting a recycling program yourself or putting pressure on local authorities to initiate one. Manuals are available on how to set up a recycling program. (See Resources.)

Reduce the number of toxic products you use

- Avoid products, such as many scouring powders, which contain chlorine bleach. Avoid aerosols.
- Use preventive measures to avoid the use of toxic products in household maintenance. For example, put a piece of screen over the drain to catch food particles or hair and pour grease into a container (which can eventually be thrown in the trash) instead of down the drain. Wipe the oven after each use or use oven liners to catch spills to avoid hard-to-clean baked-on stains. Air out the house occasionally to eliminate the need for air fresheners and to help prevent mold from developing.

Dispose of toxic products properly

- If there is no alternative to a toxic product or if a product poses environmental hazards, try to dispose of it properly or store it in as safe a manner as possible until a proper disposal alternative becomes available.
- After changing the oil in your car, do not pour it down the drain or a storm sewer, put it in the trash, apply it to dirt roads, burn it, or dump it in the backyard. Collect it and take the used oil to a designated collection center. Recycling kits have been developed for people who change their own oil, providing containers which can be filled and then set out for curbside recycling programs or taken to a recycling center.

- In states where tire collection and disposal is not regulated, households should contact local county officials about local tire disposal.
- Households which must dispose of spent automobile batteries should check with local or state waste management to determine where to turn them in for proper disposal.
- While citizens should put pressure on their communities to consider the collection of household batteries, the best environmental choice for the householder is the rechargeable battery.
- Householders who must dispose of large appliances should contact their local waste management authority for instructions. Fairfax, Virginia, for example, has arranged to have the capacitors which contain PCBs removed from appliances so that they may be sold to scrap dealers.
- If there are no household hazardous waste collection days in your area, ask your local waste disposal authorities to establish one and in the meantime to provide guidance for safe storage of such materials.

Suggestions for Non-Chemical Pest Control

Indoor pests

For **roaches**, sprinkle boric acid near cracks and in dark places (takes 2-10 days for results). Exercise extreme caution if there are children or pets in the home.

Sprinkle equal amounts of sugar and borax in dry area where **ants** are found. For heavy infestations mix together 2 Tbsp. boric acid, 2 Tbsp. sugar, and 1 c. water. Soak paper towels in mixture, place on dishes, and set out for ants.

To keep **termites** away EPA recommends keeping wood structures away from direct contact with the soil. Keep firewood or other wood scraps away from areas immediately around the house.

The search continues for effective non-chemical termite control. Metal or plastic barriers have been used to block termite access. Experimental methods, according to EPA, include nematodes, bait blocks, and molybdenum compounds. An electric gun has been successful against drywood termites.

Most companies, however, still use chemicals. If you think you have termites, look for a pest control company which will not insist on treating your entire house for what might be a minor problem. Some of these companies use dogs trained to locate wood-eating insects and treat only those areas. Request the use of the least toxic pesticide that will be effective and make certain that it is applied only to those areas where pests have been detected or to areas that are difficult to monitor.

Garden pests

Prevention plays a major role in gardening without pesticides. Healthy plants are more resistant to pests and disease. Use plant varieties that are appropriate for your area, enrich soil with compost and organic fertilizers, and water regularly. Rotate crops in vegetable gardens and clean up or compost fall garden debris to discourage pests.

During the growing season, check plants often so that you can stop pests before damage is extensive or there is serious infestation. Some pests such as Japanese beetles and bagworms can be picked off plants by hand before they become too numerous. For others, there are biological controls such as B.t. (*Bacillus thuringiensis*) for gypsy moth and other caterpillars and insecticidal soap for aphids, white fly, mites, grasshoppers, and harlequin bugs.

Generally, organic controls focus only on the pest so that other insects which may be natural enemies will not be affected. In some cases natural enemies may be purchased which control aphids, white fly, and small insect eggs.

It is now possible in many parts of the country to find tree and lawn care companies which will use alternative methods of pest control rather than treat every problem with synthetic chemicals.

Resources

The following national organizations are working on waste and related environmental issues.

National Organizations

Center for the Biology of Natural Systems
Queens College CUNY
Flushing, NY 11367
(718) 670-4180

Citizen Action Network
1300 Connecticut Avenue NW, Room 401
Washington, DC 20036
(202) 857-5153

Coalition for Recyclable Waste
P.O. Box 1091
Absecon, NJ 08201
(no phone number)

Environmental Action Foundation
1525 New Hampshire Avenue NW
Washington, DC 20036
(202) 745-4870

Environmental Defense Fund
257 Park Avenue South
New York, NY 10010
Recycling Hotline: 1-800-CALL EDF

INFORM
381 Park Avenue South
New York, NY 10016
(212) 689-4040

Institute for Local Self-Reliance
2425 18th Street NW
Washington, DC 20009
(202) 232-4108

National Center for Policy Alternatives
2000 Florida Avenue NW
Washington, DC 20009
(202) 387-6030

Natural Resources Defense Council
40 West 20th Street
New York, NY 10011
(212) 727-2700

Resource Policy Institute
c/o ERC
6722 Boelter Hall
UCLA

Los Angeles, CA 90024
(213) 206-5348
Contact: Arthur H. Purcell

Worldwatch
1776 Massachusetts Avenue NW
Washington, DC 20036
(202) 452-1999
(not able to answer telephone inquiries but
has relevant publications available on specific
topics)

The following organizations can provide information on specific topics.

Collection Days

City of San Bernadino
Department of Environment
385 North Arrowhead Avenue
San Bernadino, CA 92415
(714) 387-4646

Dana Duxbury & Associates
Waste Watch Center
16 Haverhill Road
Andover, MA 01810
(508) 470-3044

Florida Amnesty Days Program
Department of Environmental Regulation
2900 Blair Stone Road
Tallahassee, FL 32301
(904) 487-3892

Home Chemical Awareness Coalition
Michigan State Extension Service
Agriculture Hall, Room 405
Michigan State University
East Lansing, MI 48824
(517) 355-9578

King County Solid Waste Division
450 King County Administration Building
500 4th Avenue
Seattle, WA 98104
(206) 296-4434
Contact: Scott Blair
(also recycling)

Household Toxics Disposal and Alternatives

Bio-Integral Resource Center
1307 Acton Street
Berkeley, CA 94706
(415) 524-2567
(alternatives to pesticides)

Chesapeake Bay Foundation
162 Prince George Street
Annapolis, MD 21401
(301) 268-8816

Environmental Resources Center
College of Agricultural and Life Science
University of Wisconsin Extension
216 Agriculture Hall
1450 Linden Drive
Madison, WI 53706
(608) 262-0142
Contact: Elaine Andrews

Hazardous Waste Research
Information Center
1808 Woodfield Drive
Savoy, IL 68174
(217) 333-8956

Household Hazardous Waste Project
901 South National Avenue
Box 87
Springfield, MO 65804
(417) 836-5777

Local Government Commission
909 12th Street, Suite 205
Sacramento, CA 95814
(916) 448-1198

Recycling

Alabama Conservancy
2717 7th Avenue South
Suite 201
Birmingham, AL 35233
(205) 322-3126

Association of New Jersey
Environmental Commissions
800 Mendham Road
Mendham, NJ 07845
(201) 539-7547

Berkeley's Ecology Center
1403 Addison Street
Berkeley, CA 94702
(415) 644-3822

Californians Against Waste
909 12th Street, Suite 201
Sacramento, CA 95814
(916) 443-5422

Connecticut Citizens Action Research Group
51 Van Dyke Avenue
Hartford, CT 06106
(203) 523-9232

Connecticut Fund for the Environment
152 Temple Street
New Haven, CT 06510
(203) 787-0646

Ecology Center of Ann Arbor
417 Detroit Street
Ann Arbor, MI 48104
(313) 761-3186
(also household hazardous waste)

Florida Sierra Club
2905 NW 12th Place
Gainesville, FL 32605
(904) 392-0485
Contact: Dr. Dwight Adams

Group for the South Fork
P.O. Box 569
Bridgehampton, NY 11932
(516) 537-1400

Massachusetts Trash Action Coalition
186 South Street, 5th Floor
Boston, MA 02111
(617) 423-4661
Contact: Lee Kettleton

The Minnesota Project
A Center for Public Policy Study and
Community Development
2222 Elm Street SE
Minneapolis, MN 55414
(612) 378-2142

National Recycling Coalition
1101 30th Street NW, Suite 305
Washington, DC 20007
(202) 625-6406

Natural Resources Council of Maine
217 State Street
Augusta, ME 04330
(207) 622-3101

Newark Division of Engineering
Room 410, City Hall
920 Broad Street
Newark, NJ 07102
(201) 733-4356

The Ohio Alliance for the Environment
445 King Avenue
Columbus, OH 43201
(614) 421-7819

Philadelphia Recycling Office
14th Floor, City Hall
Philadelphia, PA 19107
(215) 686-5586

Portland Recycling Team
2005 North Portland Boulevard
Portland, OR 97217
(503) 228-5375

Recycle Now!
1873 South Bellaire, Suite 510
Denver, CO 80222
(303) 691-5564
(in Colorado 1-800-438-8800)

Texas Committee on Natural Resources
5934 Royal Lane, Suite 223
Dallas, TX 75230-3803
(214) 368-1791

Car Batteries

Rhode Island Department of Environmental
Management
Office of Environmental Coordination
Hazardous Waste Reduction Section
83 Park Street
Providence, RI 02903-1037
(401) 277-2808
Contact: Eugene B. Pepper

Household Batteries

New Hampshire Vermont Solid Waste Project
Room 336
Moody Building
Claremont, NH 03743
(603) 543-1201

Used Oil

City of Sunnyvale Recycling Center
P.O. Box 37007
Sunnyvale, CA 94086
(408) 730-7277
Contact: Richard Gurney

EPA Used Oil Recycling Program
Office of Solid Waste
Office of Program Management and Support
US Environmental Protection Agency
401 M Street SW
Washington, DC 20460
(202) 382-4627

Project Rose
Box 6373
Tuscaloosa, AL 35487-6373
(205) 348-4878
Contact: Janet Graham

The following state agencies are working on recycling and composting.*

Recycling

Alabama
Department of Environmental Management
Solid Waste Division
Montgomery, AL 36109
(205) 271-7761

Alaska
Solid Waste Program Manager
Department of Environmental Conservation
P.O. Box 0
Juneau, AK 99811
(907) 465-2671

Arizona
Community Energy Planner
Energy Office
1700 W. Washington Street
Phoenix, AZ 85007
(602) 542-3633

Arkansas
Solid Waste Program Coordinator
Solid Waste Division
Pollution Control and
Ecology Department
P.O. Box 9583
Little Rock, AR 72209
(501) 562-7444

California
Division of Recycling
Department of Conservation
1025 P Street, Room 401
Sacramento, CA 95814
(916) 323-3743

Colorado
Waste Management Division
Department of Health
4210 East 11th Avenue
Denver, CO 80220
(303) 331-4830

Connecticut
Recycling Coordinator
Department of Environmental Protection
Solid Waste Division
122 Washington Street
Hartford, CT 06106
(203) 566-5847

Delaware
Solid Waste Management Branch
Department of Natural Resources
and Environmental Control
89 Kings Highway
P.O. Box 1401
Dover, DE 19903
(302) 736-3689

District of Columbia
Chief, Environmental Policy Development
Office of Policy and Planning
Department of Public Works
2000 14th Street NW, 7th Floor
Washington, DC 20009
(202) 939-8115

Florida
Recycling Coordinator
Department of Environmental Regulation
Twin Towers
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(904) 488-0300

Georgia
Manager, Hazardous Waste Information
and Education
Environmental Protection Division
Department of Natural Resources
205 Butler Street SE
Atlanta, GA 30334
(404) 656-2833

Hawaii
EPHS Division
Department of Health
P.O. Box 3378
Honolulu, HI 96801
(808) 548-6410

Idaho
Department of Health and Welfare
450 West State Street, 3rd Floor
Boise, ID 83720
(208) 334-5879

Illinois
Manager, Resource Recovery
Department of Energy and Natural Resources
325 West Adams, Room 300
Springfield, IL 62704
(217) 524-5454

*List courtesy of *Bicycle* magazine, Box 351, Emmaus, PA 18049

Indiana

Office of Solid and Hazardous Waste
Department of Environmental Management
P.O. Box 6015
Indianapolis, IN 46206
(317) 232-8883

Iowa

Recycling Coordinator
Department of Natural Resources
Wallace State Office Building
900 East Grand Avenue
Des Moines, IA 50319
(515) 281-8176

Kansas

Solid Waste Management Section
Department of Health and Environment
Forbes Field Building 729
Topeka, KS 66620
(913) 296-1594

Kentucky

Solid Waste Branch
Division of Waste Management
18 Reilly Road
Frankfort, KY 40601
(502) 564-6716

Louisiana

Director of Recycling
Solid Waste Division
Department of Environmental Quality
438 Main Street
Baton Rouge, LA 70804
(504) 342-1216

Maine

Office of Waste Reduction and Recycling
Maine Waste Management Agency
286 Water Street
State House Station 154
Augusta, ME 04333
(207) 289-5300

Maryland

Office of Waste Minimization
and Recycling
Department of the Environment
2500 Broening Highway
Building 40, 2nd Floor
Baltimore, MD 21224
(301) 631-3315

Massachusetts

Recycling Director
Division of Solid Waste Disposal
Department of Environmental Protection
1 Winter Street, 4th Floor
Boston, MA 02108
(617) 292-5961

Michigan

Recycling and Recovery Unit
Department of Natural Resources
P.O. Box 30241
Lansing, MI 48909
(517) 373-0540

Minnesota

Office of Waste Management Grants
and Assistance
Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
(612) 296-6300

Mississippi

Groundwater Protection Branch
Pollution Control Bureau
P.O. Box 10385
Jackson, MS 39289
(601) 961-5119

Missouri

Solid Waste Planning Unit
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
(314) 751-1492

Montana

Solid and Hazardous Waste Bureau
Department of Health and
Environmental Science
Cogswell Building, B209
Helena, MT 59620
(406) 444-2821

Nebraska

Department of Environmental
Control-Land Quality
P.O. Box 98922, Statehouse Station
Lincoln, NE 68509-8922
(402) 471-4210

Nevada

Energy Programs Manager
Office of Community Services
Capital Complex 8116
Carson City, NV 89710
(702) 885-4008

New Hampshire

State Recycling Coordinator
Department of Environmental Services
6 Hazen Drive
Concord, NH 03301
(603) 271-2902

New Jersey

Office of Recycling
Department of Environmental Protection
401 E. State Street
Trenton, NJ 08625-0414
(609) 292-0331

New Mexico

Health and Environment Department
1190 St. Francis Drive
Santa Fe, NM 87503
(505) 827-2780

New York

Chief, Bureau of Waste Reduction
and Recycling
Division of Solid Waste
Department of Environmental Conservation
80 Wolf Road, Room 200
Albany, NY 12233-4015
(518) 457-7337

North Carolina

Environmental Supervisor
Solid Waste Management Branch
Department of Human Services
P.O. Box 2091
Raleigh, NC 27602-2091
(919) 733-0692

North Dakota

Coordinator, Solid Waste Program
Division of Waste Management
Department of Health
Box 5520
Bismarck, ND 58502-5520
(701) 224-2366

Ohio

Division of Litter Prevention and
Recycling
Department of Natural Resources
Building E1, Fountain Square
Columbus, OH 43224
(614) 265-6350

Oklahoma

Director, Solid Waste Division
Department of Health
P.O. Box 53551
Oklahoma City, OK 73152
(405) 271-7159

Oregon

Waste Reduction Section
Department of Environmental Quality
811 SW 6th Avenue, 8th Floor
Portland, OR 97204-1390
(503) 229-5913

Pennsylvania

Chief, Recycling and Waste
Reduction Section
Bureau of Waste Management
Department of Environmental Resources
P.O. Box 2063
Harrisburg, PA 17120
(717) 787-7382

Rhode Island

Recycling Coordinator
Department of Environmental Management
83 Park Street
Providence, RI 02903
(401) 277-3434

South Carolina

Division of Facility Engineering
Department of Health and Environmental
Control
2600 Bull Street
Columbia, SC 29201
(803) 734-5200

South Dakota

Director, Alternative Energy Program
Governor's Office of Energy Policy
217½ West Missouri
Pierre, SD 57501
(605) 773-3603

Tennessee

Section Chief, Division of Solid Waste
Management
Department of Health and Environment
701 Broadway
4th Floor, Customs House
Nashville, TN 37219
(615) 741-3424

Texas

Chief, Program Management Services
Division of Solid Waste Management
Department of Health
1100 W. 49th Street
Austin, TX 78756-3199
(512) 458-7271

Utah

Bureau of Solid and Hazardous Waste
Department of Environmental Health
288 N. 1460 W.
Salt Lake City, UT 84116
(801) 538-6170

Vermont

Recycling and Resource Conservation Section
Department of Natural Resources
103 S. Main Street, West Building
Waterbury, VT 05676
(802) 244-7831

Virginia

Division of Litter Control and Recycling
Department of Waste Management
101 North 14th Street
James Monroe Building, 11th Floor
Richmond, VA 23219
(804) 225-2667

Washington

Office of Waste Reduction
Department of Ecology
PV-11
Olympia, WA 98504-8711
(206) 459-6296

West Virginia

Volunteer Services Coordinator
Conservation, Education and
Litter Control
1900 Kanawha Boulevard East,
Room 732, Building 3
Charleston, WV 25305
(304) 348-3370

Wisconsin

Recycling Coordinator
Bureau of Solid Waste Management
Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
(608) 267-7565

Wyoming

Solid Waste Management Program
Department of Environmental Quality
122 West 25th Street,
Herschler Building
Cheyenne, WY 82002
(307) 777-7752

Composting**California**

Resource Conservation and Local
Planning Development
Waste Management Board
1020 Ninth Street, Suite 300
Sacramento, CA 95814
(916) 322-7364

Connecticut

Department of Environmental Protection
122 Washington Street
Hartford, CT 06106
(203) 566-5847

Florida

Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32301
(904) 488-0300

Louisiana

Solid Waste Division
Department of Environmental Quality
438 Main Street
Baton Rouge, LA 70804
(504) 342-1216

Massachusetts

Compost Director, Division of Solid
Waste Management
Department of Environmental Quality and
Engineering
1 Winter Street, 4th Floor
Boston, MA 02108
(617) 292-5960

Michigan

Recycling and Recovery Unit
Department of Natural Resources
P.O. Box 30241
Lansing, MI 48909
(517) 373-0540

Minnesota

Office of Waste Management Grants
and Assistance
Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
(612) 296-6300

New Hampshire

Solid Waste Bureau
Department of Environmental Services
6 Hazen Drive
Concord, NH 03301
(603) 271-2925

New Jersey

Office of Recycling
Department of Environmental Protection
401 East State Street
Trenton, NJ 08625-0414
(609) 292-0331

New York

Supervisor, Residuals Management Section
Bureau of Municipal Waste
Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
(518) 457-7337

Rhode Island

Department of Environmental Management
83 Park Street
Providence, RI 02903
(401) 277-3434

Vermont

Recycling and Resource Conservation Section
Department of Natural Resources
103 S. Main Street, West Building
Waterbury, VT 05676
(802) 244-7831

Washington

Office of Waste Reduction
Department of Ecology
PV-11
Olympia, WA 98504-8711
(206) 459-6296

Wisconsin

Assistant Recycling Coordinator
Bureau of Solid Waste Management
Department of Natural Resources
101 S. Webster Street
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"Source reduction can either be seen as an onerous and restrictive task, or as an opportunity to design better quality products and services. New products and ways of doing business may change our lifestyles, but we are likely to experience an increase in the overall quality of life—visible on our beaches and in our neighborhoods."

Karen Hurst

Paul Relis

The Next Frontier: Solid Waste Source Reduction

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About CONCERN

CONCERN, Inc. is a non-profit, tax-exempt organization, founded in 1970, that provides environmental information to individuals and groups and encourages them to act in their communities. The primary activity of this organization is the publication and distribution of reports which define key environmental issues and contain suggestions for individual and group action. Further support is offered through an active community outreach program. CONCERN's projects are supported by private grants and individual contributions.

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